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AMENDMENTS TO THE CLAIMS

Listing of Claims:

This Listing of Claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A-An isolated population of labeled oligonucleotide probes, each labeled oligonucleotide probe comprising an oligonucleotide associated with a series of detectably distinguishable signal molecules, the number and type of signal molecules identifying the nucleotide sequence of the probe, the number of probes in the population exceeding the number of unique signal molecules, wherein the type of nucleotide at each position in at least one of the labeled oligonucleotide probes is identified by an intensity of at least one of the unique signal molecules.

- (Original) The population of labeled oligonucleotide probes of claim 1, wherein each unique signal molecule is present up to 4 times per labeled oligonucleotide probe.
- (Original) The population of labeled oligonucleotide probes of claim 2, wherein
 the number of unique signal molecules is equal to the number of nucleotides of the labeled
 oligonucleotide probe.
 - 4. (Canceled)

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5. (Original) The population of labeled oligonucleotide probes of claim 1, wherein

each labeled oligonucleotide probe comprises an intensity reference signal molecule.

6. (Original) The population of labeled oligonucleotide probes of claim 1, wherein

each oligonucleotide is an identical length of about 10 to 50 nucleotides.

7. (Original) The population of labeled oligonucleotide probes of claim 1, wherein

the signal molecules are Raman labels.

8. (Currently amended) The population of labeled oligonucleotide probes of claim 7.

wherein the series of signal molecules comprise a polymethine dye or a signal molecule-of-Table 1

selected from the group consisting of 2-Aminopurine, 2-Fluoroadenine, 4-Amino-pyrazolo[3,4-

dlpyrimidine, 4-Pyridinecarboxaldoxime, 8-Azaadenine, Adenine, 4-Amino-3,5-di-2-pyridyl-4H-

1.2.4-triazole, 6-(g.g-Dimethylallylamino)purine, Kinetin, N6-Benzoyladenine, Zeatin, 4-Amino-

2.1.3-benzothiadia- zole, Acriflavine, Basic blue 3, Methylene Blue, 2-Mercapto-benzimidazole, 4-

Amino-6-mercaptopyrazolof3.4-dlpyrimidine, 6-Mercaptomurine, 8-Mercaptoadenine (adenine

thiol), 9-Aminoacridine, Cvanine dves, Ethidium bromide, Fluorescein, Rhodamine Green, and

Rhodamine-6G.

9. (Original) The population of labeled oligonucleotide probes of claim 1, wherein

the signal molecules are fluorescent labels or quantum dots.

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10. The population of labeled oligonucleotide probes of claim 1, wherein (Original)

the signal molecules are a series of nanotags.

11. (Original) A method to identify a nucleotide sequence of a target nucleic acid.

the method comprising:

a) contacting a target nucleic acid with a population of labeled oligonucleotide probes, each

labeled oligonucleotide probe comprising a series of detectably distinguishable signal molecules

associated with an oligonucleotide, the oligonucleotide being identifiable by the number and type of

associated signal molecules, wherein the number of probes exceeds the number of unique signal

molecules;

b) separating bound oligonucleotide probes from unbound labeled oligonucleotide probes;

c) detecting a signal generated from the bound labeled oligonucleotide probes; and

d) decomposing the signal to identify the number and type of signal molecules in the bound

labeled oligonucleotide probes, thereby identifying a nucleotide sequence of the target nucleic acid.

12. (Original) The method of claim 11, wherein each unique signal molecule is

present up to 4 times per labeled oligonucleotide probe.

13. (Original) The method of claim 12, wherein the number of unique signal

molecules is equal to the number of nucleotides of the labeled oligonucleotide probe.

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14. (Original) The method of claim 13, wherein the nucleotide occurrence of each

nucleotide position of the labeled oligonucleotide probe is identified by a number of copies of a

unique signal molecule.

15. (Original) The method of claim 11, wherein each labeled oligonucleotide probe

comprises an intensity reference signal molecule.

16. (Original) The method of claim 11, wherein each oligonucleotide is an identical

length of about 10 to 50 nucleotides.

17. (Original) The method of claim 11, wherein the population of labeled

oligonucleotide probes comprises all possible sequence combinations of an oligonucleotide of the

identical length.

18. (Original) The method of claim 11, wherein the signal molecules are Raman

labels

19. (Original) The method of claim 18, wherein the series of signal molecules

comprise a polymethine dve or a signal molecule of Table 1.

20. (Original) The method of claim 11, wherein the signal molecules are fluorescent

labels or quantum dots.

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21. (Original) The method of claim 11, wherein the signal molecules are a series of

nanotags.

22. (Original) The method of claim 11, further comprising contacting the target

nucleic acid, or a fragment thereof, with a population of capture oligonucleotide probes bound to a

substrate at a series of spot locations before contacting the target nucleic acid with the population of

labeled oligonucleotide probes.

23. (Original) The method of claim 22, further comprising ligating labeled

oligonucleotide probes with capture oligonucleotide probes that bind adjacent target segments of the

target nucleic acid.

24. (Currently amended) A reaction mixture, comprising a target polynucleotide and a

an isolated population of labeled probes, wherein each labeled probe comprises an oligonucleotide

associated with a series of detectably distinguishable signal molecules, the nucleotide sequence of

each oligonucleotide being represented by the number and type of signal molecules associated with

the oligonucleotide, wherein the number of probes exceeds the number of unique signal molecules,

wherein the type of nucleotide at each position in at least one of the labeled probes is identified by

an intensity of at least one of the unique signal molecules.

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25. (Original) The reaction mixture of claim 24, wherein each unique signal

molecule is present up to 4 times per labeled oligonucleotide probe.

The reaction mixture of claim 25, wherein the number of unique 26. (Original)

signal molecules is equal to the number of nucleotides of the labeled oligonucleotide probe.

27. (Canceled)

28. (Original) The reaction mixture of claim 24, wherein each labeled

oligonucleotide probe comprises an intensity reference signal molecule.

29. (Original) The reaction mixture of claim 24, wherein each oligonucleotide is an

identical length of about 10 to 50 nucleotides.

30. (Original) The reaction mixture of claim 24, wherein the population of labeled

oligonucleotide probes comprises all possible sequence combinations of an oligonucleotide of the

identical length.

31. The reaction mixture of claim 24, wherein the signal molecules are (Original)

Raman labels.

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32. (Currently amended) The reaction mixture of claim 31, wherein the series of signal

molecules comprise a polymethine dye or a signal molecule of Table 1 selected from the group

consisting of 2-Aminopurine, 2-Fluoroadenine, 4-Amino-pyrazolo[3,4-d]pyrimidine, 4-

Pyridinecarboxaldoxime, 8-Azaadenine, Adenine, 4-Amino-3,5-di-2-pyridyl-4H-1,2,4-triazole, 6-

(g,g-Dimethylallylamino)purine, Kinetin, N6-Benzoyladenine, Zeatin, 4-Amino-2,1,3-benzothiadia-

zole, Acriflavine, Basic blue 3, Methylene Blue, 2-Mercapto-benzimidazole, 4-Amino-6-

mercaptopyrazolo[3,4-d]pyrimidine, 6-Mercaptopurine, 8-Mercaptoadenine (adenine thiol), 9-

Aminoacridine, Cyanine dyes, Ethidium bromide, Fluorescein, Rhodamine Green, and Rhodamine-

<u>6G</u>.

33. (Original) The reaction mixture of claim 24, wherein the signal molecules are

fluorescent labels.

34. (Original) The reaction mixture of claim 24, wherein the signal molecules are a

series of nanotags.